EPDM Coatings LLC.

105 Radcliffe Ave Suite 101
West Lawn, PA 19609
Phone 1-866-311-3736
E-mail info@edpmcoatings.com
Website: http://www.epdmcoatings.com

METAL ROOFS WITH LIQUID RUBBER

Liquid Roof may be applied on roof decks, gutters, structural steel, air conditioner enclosures, cooling towers, galvanized steel, unit heater flues, smoke stacks and chimneys, fiberglass and non porous masonry surfaces.

Surface preparation

All surfaces to be coated should be clean and dry. Remove peeling paint and brittle caulking. Heavy build ups of asphalt roof cement should also be removed. Tighten any loose fasteners and replace those which are severely corroded. Repair or replace roof panels damaged by storms. Remove heavy rust with abrasive discs or wire brushes. Power wash all surfaces to be coated and allow to dry thoroughly. Caulk all gaps wider than 1/16 inch which are not expansion and contraction slip surfaces.

Treating rusted areas

It is recommended that a corrosion inhibitive primer first be applied to areas where severe rusting has occurred. Liquid Rubber does not contain any corrosion inhibiting pigments but it is such an effective moisture barrier that it may be directly applied over light rust without a primer.

Going over existing coatings

[1] **Original mill finish**
If still tightly adhering, it can be top coated directly with Liquid Rubber. Corrosion inhibitive primer should still be used on severely corroded areas.

[2] **Alkyd paints**
Aged alkyd paints that were applied over the original mill finish should be checked for adhesion. If coating is brittle and can be scraped off easily, it must be removed before Liquid Rubber can be applied. If removal can be accomplished with high pressure water spray, that should be the method of choice. If removal is spotty, the roof should be allowed to weather another year before removal is again attempted. Brittle alkyd paint will continue to lose adhesion over time and will result in predictable failure if not removed.

[3] **Asphalt based coatings**
Liquid Roof should not be applied directly over an asphalt based coating. Water based acrylic elastomeric coatings may be used as intermediate coats before applying Liquid Rubber. Asphalts should be considered as being unstable materials and are excluded from warranty coverage. Caution-Latex house paints can not be substituted in place of the acrylic elastomeric coating.

[4] **Acrylic elastomeric coatings**
Liquid Roof bonds very well to these coatings. Some of the earlier acrylic elastomeric formulations were prone to the development of underfilm corrosion. There usually is little visual evidence of this on the surface of the acrylic so small sections of coating must be removed from different parts of the roof to determine whether the condition exists and how severe it is. A visual inspection of the underside of the roof panels can reveal total penetration in the most severe cases.

The decision of whether to apply Liquid Roof over an area with severe underfilm corrosion becomes an economic one. The recommendation should be to replace the corroded panels. However, if this is not an economically viable solution and removal of the coating is equally impractical, then application of the Liquid Rubber may be justified as being the best of the available alternatives. No warranty would apply in such a case.

Mixing

Proper incorporation and thorough mixing of the catalyst is critical to achieving desired cured film properties and should, therefore, be done with great care. Container is filled low to allow room for mixing as well as the addition of the catalyst. Insert mixing paddle in Liquid Rubber and mix for approximately one minute so that material is moving uniformly and has formed a vortex. Slowly add catalyst into this vortex at a rate which allows it to be incorporated without puddling. **DO NOT pour catalyst on top of Liquid Rubber/Liquid Roof prior to starting mixer**. After all the catalyst has been added, the mixer (if hand held) should be moved in a circular fashion around the periphery of the pail as well as up and down to insure that the catalyst is completely and uniformly mixed. Periodically scrape the sides with a rubber or metal spatula to incorporate the stagnant layer of material adhering to walls of pail.

Application of Liquid Rubber

For Flat Surfaces (flat or low slope)

First, catalyze the rubber: Pour a quantity on the surface and broadcast with a rubber edged squeegee. Follow this with a short-knap roller (lint free mohair) to evenly distribute the wet film. Spread rubber at no more than 45 sq. ft. per gallon.

Spraying

Airless or Air Atomized spraying is the only feasible application method for corrugated or standing seam roofs. Airless equipment needs only one hose from pump to gun but must generate 3500-4000 psi pressure and is limited in the length of hose which can be used because of high pressure drops. Air atomized equipment requires two hoses to the gun making it more cumbersome to maneuver plus the addition of a compressor**. 100 mesh strainers should always be used when spraying.**

A.) **Equipment**: Use a 3.0 gallon per minute airless spray pump capable of developing a minimum 3,000 psi outlet pressure; 3/8 inch ID hose or larger with a max length of 100 ft. Tip size of .015 or .017 for smaller pumps and a .019 tip for larger capacity pumps. Use a 100 mesh strainer at the outlet of pump or in handle of gun. Use a swivel fitting at the gun in place of a "whip" in order to reduce the pressure drop through a smaller ID hose.

B.) **Thinning**: It will be necessary to thin Liquid Rubber® with xylene solvent before it can be sprayed. The amount of xylene needed will vary depending on pump size and material temperature. The following is a recommended starting point procedure for thinning a 5-gallon pail: Do not exceed 3 quarts of xylene per pail

1.) Add two quarts of xylene to pail and mix until uniform.
2.) Add entire amount of catalyst supplied. Mix thoroughly.
3.) Transfer ½ contents to another pail.
4.) Start pump and check spray pattern. If spray is too coarse, try a .015 tip. If this still isn't enough improvement, then add 1/2 quart of xylene to the 2 1/2 gallons of rubber in the pail. Once an acceptable spray pattern is achieved, use the same amount of xylene to dilute each succeeding pail. Pour newly mixed rubber into pail under the pump as needed.

Trouble Shooting Procedure

Poor spray pattern and clogging of the tip are the most frequently encountered problems during application. These can invariably be traced to inadequate flushing and poor maintenance of the equipment. Check to make certain the 100 mesh strainer is clean before starting.

Problem: Poor spray pattern.
Solution: Follow thinning procedure in B.)

Problem: Still getting a poor spray pattern, even after thinning rubber with 2 quarts of xylene per 5 gallon pail.
Solution: Starting at gun, successively remove one component at a time, (i.e. tip, tip extension, gun filter, gun, strainer at pump, etc.) and check flow.

With tip removed, the material flow should be steady and strong (discharge into pail at pump.)

If tip extension is removed and flow increases noticeably, the ID of the extension is too small. Remove or replace.

If discharge stream is weak and pulsating, attach gun and open drain cock at strainer to see if condition is the same there. If pulsation persists, the problem is in the pump. (The balls are not seating properly or are dented and need replacing.)

Liquid Roof will produce greater line drops and spray with narrower fan than most other coatings. Some solvent [xylene or mineral spirits] may be used to thin the product to make it spray easier. This dilution should not exceed 2 quarts solvent per 5 gallon pail. The recommended procedure is to spray apply and roll back with a short nap roller to obtain an even film and complete surface coverage. Application should be at rate of 40 square feet per gallon. This will produce a 20 mil dry film. The chemical and physical properties of Liquid Rubber make it possible to achieve a 20 mil dry film on sloped or vertical surfaces with one evenly applied coat.

Spray-on followed by rolling where surfaces configuration permits will produce an even film. Roller marks will level out in a few minutes.

Fasteners

Caulking around fasteners is usually not necessary. The physical properties of the EPDM Rubber will produce a longer lasting seal around fasteners than caulks can because the latter will embrittle with age causing loss of adhesion and cracking.

It is good practice to brush the Liquid Rubber into the fasteners after spray application to ensure complete coverage. This procedure will still be less time consuming than caulking.

Fabric reinforcing of seams and overlaps

Tight overlaps and standing seam joints do not need to be reinforced.

Overlaps with gaps greater than 1/16 inch and corroded edges should receive fabric reinforcing. Apply a light coat of Liquid Rubber, center the fabric on the overlap and roll it out taking care not to create wrinkles; press fabric down with squeegee or wide spatula; spray apply a full coat of Liquid Rubber to seal top surface of fabric and roll back over to ensure coverage .

Overspray

If overspray lands on cars, it can be easily removed with Mineral Spirits within 24 hours. Thereafter, stronger solvents such as Xylene will be effective in removing the Roof but may dull some finishes. Black, one foot square test panels should be placed in various parts of the parking area as evidence of overspray in the event later claims are made.

Flushing Spray equipment

Three separate flushes with Xylene are recommended. (Save this solvent for future use) .

When the last of the Liquid Rubber is sucked from the pail, add several gallons of Xylene to pail to purge material from line and onto roof. Remove gun from the hose and place end of hose in same bucket as pump suction. Reduce pump delivery pressure and allow solvent to recirculate for five minutes. Remove suction tube from bucket and purge line. Starting with clean solvent or the final flush from a previous cleaning, repeat the procedure two more times.

The gun can be reattached during the final flush for cleaning.

Pail handling and disposal Pour material from newly mixed pail into the one from which the pump is sucking. Scrape the sides of the just emptied pail into the next one to be mixed. Only a thin film of material should remain. When this procedure is used, the pails can be collapsed and placed in a trash dumpster or taken to a metal recycler.

Rain showers or freezing temperatures.

Unexpected rain showers after application may affect the surface appearance but will not wash material off roof. Temperature drops below freezing will arrest the cure but will not damage Liquid Rubber. The cure reaction will resume again whenever adequate temperature returns.

Surface preparation-

Surface to be coated should be clean, dry and structurally sound. Fasten loose areas with adhesive [contact cement] or pop rivets. Oil or wax must be completely removed with solvent.

Remove loose portions of existing coatings and brittle caulk with scraper and wire brush. Whatever still has good adhesion may remain to be recoated.

Rusty or pitted metal should be wire brushed to remove loose oxide. Tightly adhering corrosion may be directly coated with Liquid Roof.

Asphalt based aluminum coatings should be removed as much as possible by wire brush or abrasive disc. Roof cements should be removed and replaced with butyl caulk where necessary.

Repair torn rubber by regluing loose areas with contact cement. Coat exposed edges with contact cement to prevent solvent absorption from Liquid Roof. A rubber patch may be applied over torn area if desired.

Remove chalk from white rubber membrane by brushing with a detergent solution followed by a water rinse or working surface with a stiff brush.

Smooth metal or plastic surfaces should be roughed up to improve adhesion of Liquid Roof. A deglossing solvent may work on some plastics.

Temperature and Cure Conditions:

Liquid Roof may be applied at any temperature that permits it being spread onto surface. It will waterproof immediately upon application. The solvent will evaporate at a rate governed by temperature but will not be affected by relative humidity. Exposure to freezing temperatures before cure has taken place will not damage the films. The time necessary to reach cure should not be a concern as this process will occur automatically. Exposure to sunlight will accelerate the curing process. The final film properties of the cured membrane will be the same regardless of the time required to achieve cure. Liquid Roof will provide long term protection even under extreme exposure conditions. Please read all safety precautions and heed all warnings.

The following properties are available from a liquid EPDM coating:

excellent water, vapor and gas barrier;
temperature tolerance from minus 60 degrees F. to plus 300 degrees F.;
elastomeric;
Ozone and UV stability;
broad chemical resistance from strong bases to acids;
high dielectric value;
excellent corrosion protection on steel and aluminum;
not affected by salts;
resists cathodic disbondment ;
easily repairable.

If you have a special application simply provide the following information and we will let you know if liquid EPDM can meet your needs.
1) Description of Product or process...
2) Describe substrate to be protected...
3) Temperature range of process or environment...
4) Describe chemical environment if applicable...
5) under what conditions would coating be applied? Controlled plant environment or field

EPDM LIQUID RUBBER.

Chemical composition.

Liquid Roof is based on a low molecular weight terpolymer of Ethylene and Propylene with a pendant group of Dicyclopentadiene.The Ethylene-Propylene backbone is saturated and crosslinking takes place via the DCPD group.

Cure Mechanism.

Crosslinking takes place at ambient temperatures. Free radicals resulting from the decomposition of the organic peroxide cause crosslinking to take place at the DCPD sites. The rate at which the peroxide decomposes, therefore, determines the rate at which the system will cure. This rate is determined by temperature and the availability of oxygen. Oxygen is necessary to activate a catalyst which promotes peroxide decomposition at lower temperatures. The cure mechanism in EPDM Liquid Rubber will vary from active to inactive, determined by temperature. Faster cures and slow cures over extended periods of time result in identical physical properties. Broad day-night temperature swings in spring and fall will not compromise the final physical properties of the Liquid Rubber Membrane.

Physical Properties.

The physical properties of Liquid Rubber/Liquid Roof are typical of its EPDM chemistry.

The outstanding characteristics include:

- Extremely high resistance to penetration of water
- Ultra Violet and Ozone stable
- Excellent long term aging properties (i.e. retains its flexibility and elongation longer than other elastomers);
- Very broad temperature tolerance range [from 300 degrees F to minus 62 degrees F]
- Acid and alkali resistant
- Resistant to polar solvents
- Withstands ponding water even when not cured

Weakness-oils, fats and waxes will swell the polymer.

Application characteristics:

The slow curing and non-polar nature of EPDM Liquid Rubber give it outstanding surface wetting properties. The product does not fill cracks and crevices but will produce an even film penetrating even the smallest cracks and irregularities. An example of this is, when EPDM Liquid Rubber is applied over porous surfaces such as poured concrete, pinholes will appear on the surface as the material slowly displaces the air in the pores. This surface wetting feature enables the product to be applied in a single coat over non porous surfaces and still result in complete film integrity. EPDM Liquid Roof is hydrophobic in its liquid as well as the cured state and will withstand water immersion at any stage of its cure cycle.

EPDM Liquid Roof should not be used where the material does not have exposure to oxygen such as between two impervious materials. When oxygen is available curing takes place from both top and bottom of film. There is sufficient oxygen available on most surfaces to initiate cure from the bottom. Oxygen readily penetrates films 20 mils thick. Curing is considerably retarded in thick films, however, cures do take place in thicknesses up to 75-80 mils within a three month period at temperatures over 70 degrees F. EPDM Liquid Rubber can be applied to hot roof surfaces encountered during summer. The solvent in the system will flash off rapidly but the polymer will remain soft long enough to permit overlapping even after 1-2 hours. The cure rate is still controlled even at temperatures up to 120 degrees F and will not result in a porous film. The product can, therefore, be safely applied on the hottest day. The controlled cure rate also results in long pot life , giving the applicator more than an adequate length of time [4-6 hours depending on temperature] to use the mixed quantity of material.

Adhesion

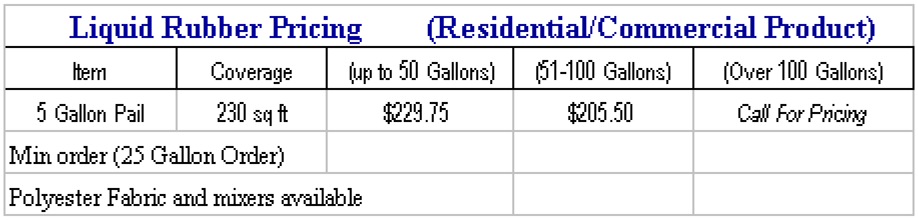
Adhesion will increase over time. Polar surfaces such as metal, concrete and wood result in stronger adhesion than non-polar surfaces such as asphalts and single ply EPDM sheet. Most weathered surfaces including single ply and thermoplastic membranes will have enough of a surface profile to anchor the Liquid Roof.

Durability.

By itself, the Liquid Roof membrane will exhibit the characteristics of its EPDM chemistry, i.e. U.V. and ozone stability, excellent ponding water resistance and long-term retention of flexibility. However, since it is always applied to an existing roof surface,the condition of that surface will determine overall life expectancy.

Liquid Roof applied over generally sound single ply EPDM can extend its life another 20 years. The useful life of metal roofs also benefits greatly when Liquid Rubber is applied. BUR systems often have existing problems such as delamination between layers, buckling and stress cracking. These are further aggravated by wet insulation which often results in severe corrosion and weakening of the metal supporting deck. Projecting a life expectancy for the EPDM Liquid Roof membrane ultimately comes down to a case by case determination. When the EPDM membrane is compared to urethanes, acrylics and other elastomers in accelerated weathering and heat aging tests, the EPDM shows itself to be superior.

Pricing



Liquid Rubber Pricing (Residential/Commercial Product)

Item	Coverage	(up to 50 Gallons)	(51-100 Gallons)	(Over 100 Gallons)
5 Gallon Pail	230 sq ft	$229.75	$205.50	*Call For Pricing*
Min order (25 Gallon Order)				
Polyester Fabric and mixers available				

Liquid EPDM Rubber vs. Neoprene Rubber for waterproofing concrete pipe and vessels

EPDM rubber was not available in liquid form until relatively recently so Liquid Neoprene rubber became the material of choice for protecting concrete against both fresh and salt water. The Liquid Neoprene products are simple solvent solutions or water based emulsions and therefore have low solids content and relatively low molecular weights. These limitations made multiple coat applications necessary and required top coating with other polymers to prevent ultra violet degradation.

The development of Liquid EPDM Rubber resulted in a high solids, two components chemically reactive product capable of polymerizing at ambient temperatures(55 F (13 C) and higher). This product can be applied at a 30 mil dry film (.76 mm) in a single application because of the high solids content. Its chemical cure feature then results in a high molecular weight film with protective and performance properties exceeding those of liquid applied Neoprene films.

Liquid EPDM Rubber can withstand boiling water or live steam and is inherently UV and ozone stable. The product is safer to use because of its higher flash point and the two component packaging permits extended storage at higher temperatures than liquid Neoprene. The non polar characteristic of the EPDM also gives it advantages over Neoprene in saltwater environments as well as better resistance to cathodic disbondment.

EPDM rubber has poor resistance to oils, fats, waxes and aliphatic solvents but possesses very good resistance to ketone solvents, alcohols, polar compounds, Salts, most acids up to 50 % concentration, alkalies and water.

Advantage of Liquid EPDM Rubber.

- One coat application.
- UV and ozone stability.
- Higher flash point (105 F ; 40 C).
- Storage stability at higher temperatures .
- Can be used in extreme environments.

	Liquid EPDM	Liquid Neoprene
Product Description	Two componenet ambient temperature cure	One component solution or emulsion
Solids content(by Volume)	60-65 %	less than 30 %
Flash Point	105 F (40 C)	50 F (10 C) (solvent solution)
Tensile strength	600-800 psi (42-46 kg/cm)	1600 psi (112 Kg/cm)
Elongation	150 - 200 %	450 %
Temp. tolerance range	-60 to 300 F -76 to 149 C	-40 to 200 F -40 to 93 C

Max dry film per coat	30 mils .76 mm	4-6 mils .1 to .15 mm
Ultra violet stability	Excellent	Recommended top coatings
Water resistance fresh water sea water	excellent to 275 F (135 C) excellent to 180 F (82 C) Very good to 200 F (93 C)	excellent to 212 F (100 C) excellent to 70 F (10 C)
Oil resistance	Poor	Very good
Hydrogen sulfide (wet) resistance	Very good	Very good
Coverage	960 sq.ft/gal/mil 8.57 sq.m/l/mm	417 sq.ft/gal/mil 3.7 sq.m/l/mm
Specific gravity	1.05	
volatile organic compounds	333 gr/l	600-610 gr/l

COMMON QUESTIONS!

Q: Why is Liquid Rubber the Best Choice

A: EPDM Rubber has been used in sheet form for more than 30 years. It is probably the most durable roofing product ever developed. Liquid Rubber is nearly identical chemically to the sheet EPDM but with the distinct advantage of being liquid. EPDM is unique among rubbers in that it is ultra violet and ozone stable; it has superior water resistance; and can tolerate extreme cold to minus 62 degrees F. as well as heat exposures exceeding 300 degrees F.

Q: What Is EPDM Rubber ?

A: **EPDM** is a synthetic rubber polymer made from ethylene and propylene monomers. It was developed in the early 1960's and is used in radiator and steam hoses, freezer gaskets, tires, roofing membranes and aircraft seals to name only a few applications where EPDM is superior to other materials.

Q: What is Liquid Roof?

A: Liquid Roof is a liquid version of EPDM rubber. It cures by chemical reaction at ambient (ordinary) temperatures to form a flexible rubber membrane. A pre measured catalyst is added to the rubber compound before application. The liquid form makes it possible to apply EPDM rubber to many materials regardless of their shape.

Q: What equipment is needed and how is Liquid Roof/Liquid Rubber applied?

A:

Equipment :		
Quart and Gallon containers 3/8 inch electric drill Gallon mixing shaft Short nap roller(6 inch) brush rubber edged squeegee masking tape paint thinner for clean-up		**Four and five gallon pails** 1/2 inch electric drill Pail mixing shaft rubber edged squeegee Short nap roller(6 inch) brush masking tape paint thinner for clean-up

Application procedure

1) Incorporate supplied catalyst using drill and mixer shaft by following label directions. Let stand at least 1/2 hour before using.

2) Apply masking tape to perimeter of roof or wherever straight edges are desired. Tape can also act as

catch basin for sags if only one edge is attached to roof and rest is formed into shape of a gutter.

3) Pour some material on roof and use squeegee to distribute over surface. Follow with roller to even out the wet film. The product will self level. Use brush around vents, ladder, and antenna. Brush and roller marks will disappear when sufficient material is applied. Work from front to rear.

4) Masking tape should be left on until rubber is solid enough to be touched.

Q: How Long will it take for the Roof/Liquid Rubber to cure?

A: Cure time is controlled by temperature. At 70 degree F. and above it will take approximately 14 hours for the rubber to feel solid to the touch. Heavier films may take longer. The lowest temperature at which any cure takes place is 55 degree F. At that temperature it would take 3-4 days for the rubber to feel solid to the touch if the wet film was not more than 35 mils. Thick films take longer to cure.

Q: Must the air/ surface temperature be above 55 degree F. before can be applied?

A: No, but temperatures above freezing are preferred for physical comfort. Liquid Roof/Liquid Rubber will waterproof as soon as it is applied but no cure will take place until the temperature exceeds 55 degree F.

Q: What effect does high relative humidity or freezing temperatures have on Liquid Roof/Liquid Rubber?

A: Liquid Roof/Liquid Rubber can be applied under high humidity conditions as long as the surface is dry and its temperature is above the dew point. The solvent evaporation is governed by temperature only and is not influenced by relative humidity. If the temperature drops below freezing after it has been applied no damage will result. The rubber will slowly stiffen as the solvent evaporates and begin to cure when the temperature exceeds 55 degree F. The ultimate physical properties of the rubber membrane will always be the same regardless of the length of time needed to reach the full cure stage.

Q: How much time is available to work with it after the catalyst has been mixed in?

A: On a hot day (above 80 degrees F. the working time will be approximately four hours until the rubber becomes noticeably thicker and more difficult to apply. Working time is considerably longer at lower temperatures.

The rubber will thicken faster in direct sunlight and when liquid level is low in the container scrape liquid from sides. Put container in a cool place when longer working time is needed.

If material is refrigerated (below 50 degrees F.) after catalyst was added it can be saved and used even weeks later.

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